COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE 2003 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.	)))	**CASE NO. 2003-00051**

KENTUCKY DIVISION OF ENERGY'S COMMENTS RELATED TO THE 2003 INTEGRATED RESOURCE PLAN OF EAST KENTUCKY POWER COOPERATIVE, INC.

Comes the Natural Resources and Environmental Protection Cabinet, Division of Energy (hereinafter "KDOE"), Intervenor herein, and offers the following comments on the 2003 Integrated Resource Plan (IRP) of East Kentucky Power Cooperative, Inc. (EKPC):

In its section on load forecasts, EKPC projects that firm peak demands will increase from 2,109 MW in 2002 to 4,434 MW in 2022, an annual average increase of 3.2 percent. Annual energy use is projected to increase from 11,158 GWh in 2002 to 20,483 GWh in 2022, an annual average increase of 3.2 percent. IRP Executive Summary, pages 3-4. These growth projections are not significantly different from the projections made in 2000. IRP, page 180.

In its comments on EKPC's 2000 Resource Plan, KDOE noted that the cooperative did not perform a study to estimate the quantity of demand-side energy efficiency and load-shifting measures that would be available within its service area (i.e., a Technical Potential study), the cost of implementing such measures, and the revenue requirements that would be needed to acquire various portions of these potential resources through demand-side management (DSM) programs. KDOE Comments on EKPC's 2000 Resource Plan, 1/11/01, pages 2-3; also, Commission Staff Report on the Integrated Resource Plan of East Kentucky Power Cooperative,

Case No. 2000-044, page 7, last paragraph. Unfortunately, EKPC did not perform such a study as part of its 2003 IRP either.

In its Report on EKPC's 2000 IRP, the Commission Staff stated that "With input from these parties [i.e., from KDOE and the Attorney General's Office, if it so desires], Staff fully expects that East Kentucky's next IRP will provide a rigorous, updated, and thoroughly documented assessment of all reasonable DSM alternatives as required by 807 KAR 5:058, including potential new DSM technologies, applications and programs." Case No. 2000-044, Commission Staff Report, page 10. In KDOE's Question 11a to EKPC, it asked, "Does EKPC consider its analysis of these six programs plus the existing DSM programs to constitute the "new DSM study" recommended by the Commission Staff at the conclusion of EKPC's previous IRP case, Case No. 2000-044?" The cooperative responded, "EKPC believes that Appendix II of the IRP filing, which contains DSMANAGER analysis of existing and potentially new programs is an appropriate response to the 2000 [Staff] recommendation." EKPC response to KDOE Question 11a, page 2.

KDOE's Question 11b asked, "Did EKPC analyze the potential energy impacts of major new DSM programs in the sectors of commercial new construction, residential new construction (other than manufactured homes), industrial drivepower systems, and combined heat and power?" The response was that EKPC is currently analyzing a residential new construction program, but has not analyzed commercial new construction, industrial drivepower systems, or combined heat and power. EKPC response to KDOE Question 11b.

When KDOE asked why analyses of these major energy-using sectors were not done, EKPC answered that limited resources precluded them from analyzing all of these potential programs. EKPC response to KDOE Question 11c. KDOE followed up with a question about

industrial energy efficiency programs [Question 15]. The cooperative responded by referring to the services provided by its EnVision subsidiary, and stated: "EKPC believes it would be difficult to come up with a one size fits all for this group of customers. EKPC believes that the current method of case-by-case service is appropriate for this segment." However, no one was proposing a "one size fits all" for the industrial sector. The question is whether the two people who constitute EnVision represent an adequate allocation of resources to harvest the huge opportunities for improved energy efficiency that exist in the industrial and large-scale commercial sectors. At the informal conference on 8/19/03, EKPC representatives stated that they have visited "every industrial facility that would let us in the door," but it might be easier to induce companies to open their doors if there were a DSM program for the industrial customer class that offered financial incentives for implementing energy-saving technologies and methods.

In Case No. 2000-044, KDOE presented detailed quantitative information to indicate that the technical potential to achieve cost-effective energy savings and demand reductions in all customer classes is very large. KDOE Comments on EKPC's 2000 Resource Plan, 1/11/01, pages 13-18. For example, KDOE cited the estimate of the Environmental Energy Technologies Division of the Lawrence Berkeley National Laboratory: "If only tune-ups and performance monitoring of existing buildings were performed, average energy use could be reduced by about 20%. If proven efficiency measures were applied when a building is retrofitted (usually about every 15 years), about 50% reduction could be attained. The full range of efficiency measures that can be designed and incorporated into new buildings could bring about an energy reduction of as much as 75%." Lawrence Berkeley National Laboratory, "Creating High-Performance Commercial Buildings," *EETD News*, Fall 1999, pages 1-2. Other estimates of the potential for cost-effective savings (for example, by the Rocky Mountain Institute) are even higher.

EKPC's 2003 IRP, however, still treats energy efficiency not as a major potential resource but as a minor factor that is quantitatively negligible and is treated as a token example of "customer service." EKPC response to KDOE Question 15, page 2 of 2. When the Attorney General's Office (AG) asked about ways to reduce carbon emissions, EKPC responded, "Currently in Kentucky significant reductions of carbon emissions can be achieved by switching from coal to natural gas, sequestration of carbon or doing both switching to natural gas and sequestration of carbon." EKPC response to AG Supplemental Question 4a. The idea that large-scale energy efficiency programs could yield significant reductions in carbon emissions apparently never crossed the EKPC's mind.

The total annual energy savings from EKPC's existing DSM programs are projected to be 18.4 GWh in 2017, and the total annual projected savings from its proposed new DSM programs are 22.8 GWh in the same year. IRP, page 83, Table 6-8; EKPC response to KDOE Question 2c. The total energy requirements in the year 2017 are projected to be 17,837 GWh. IRP, page 21, Table 3-3. The sum of the energy savings from all the existing and all the new DSM programs, 41.2 GWh, thus represents only 0.23 percent of EKPC's projected energy requirements in 2017. By any standard, this is a token impact.

In its comments on EKPC's 2000 Resource Plan, KDOE outlined a comprehensive, market-focused approach that EKPC could take to estimate the technical potential for improved energy efficiency for all of its customer classes. KDOE proposed that EKPC examine energy-using functions such as space cooling, lighting, shaft power, etc.; use information sources such as E Source to identify the most efficient ways of performing these functions; and develop DSM programs that overcome market barriers to the adoption of the most energy-efficient available

design methods and technologies. KDOE Comments on EKPC's 2000 Resource Plan, 1/11/01, pages 18-19. EKPC's response to that proposal was as follows:

"While it is always helpful and informative to review how other states are conducting analyses, it is not prudent to think that those techniques can be applied without customization to the specific systems being studied. The Kentucky Public Service Commission, through its regulatory process, has helped to ensure that the ratepayers of Kentucky have some of the lowest electric costs in the United States. EKPC should implement specialized programs that make economic and environmental sense for its members based on the EKPC system's structure and Kentucky's regulatory requirements." Response of East Kentucky Power Cooperative to Intervenors' Written Comments, 2/6/01, Case No. 2000-044.

However, no one proposed that EKPC apply techniques from other states without customizing them to local conditions. While it is true that Kentucky's electric *rates* have been low for a long time, customers' total *bills* have not. KDOE believes that EKPC's ultimate customers' bills, as well as the utility's future revenue requirements and the impacts of its operations on the environment, could be lowered significantly by greatly improving the efficiency with which the services of heating, cooling, lighting, etc. are delivered.

Although EKPC developed some new DSM programs that focus on peak shifting and light bulbs, overall EKPC did not attempt to implement KDOE's previous suggestions in its 2003 IRP. IRP, pages 85-87. KDOE does not consider the partial analysis of a limited number of new DSM options contained in the 2003 IRP to constitute either a Technical Potential Study or a "rigorous, updated, and thoroughly documented assessment of all reasonable DSM alternatives," as required by 807 KAR 5:058 and as recommended by the Commission Staff. EKPC has not yet invested the effort and time necessary to seriously analyze the potential

benefits that greatly expanded DSM programs could provide to EKPC, its member cooperatives and its member cooperatives' retail customers.

KDOE highly recommends a report recently published by the American Council for an Energy-Efficient Economy titled, *America's Best: Profiles of America's Leading Energy Efficiency Programs,* by Dan York and Martin Kushler, March 2003. This report describes a number of exemplary programs in enough detail to provide sound ideas and data that can be used when designing a wide range of new DSM programs. The names, phone numbers, and e-mail addresses of program managers are also provided for those seeking further information.

Despite a projected capacity shortfall, EKPC and its member cooperatives are still promoting increased electricity use. Several of the distribution cooperatives in EKPC's system use declining block rates, in which customers pay lower prices per kWh as their usage increases. None have inclining block rate structures. "All else equal, declining block charges encourage additional demand and/or consumption since average cost declines with increases in usage. ...whatever the reasons for adopting it, a declining block rate has a promotional effect." Stutz, John, Gretchen McCain, Richard Rosen, and Deanne Samuels, *Aligning Rate Design Policies with Integrated Resource Planning: A Report to the National Association of Regulatory Utility Commissioners,* January 1994, page 55. The practice is "familiar in the marketing of commodities at retail, the practice of quantity discounts." Bonbright, James C., *Principles of Public Utility Rates,* New York: Columbia University Press, 1961, page 307. Conversely, inclining block rates would provide an economic incentive for customers to reduce their energy use. Changing the existing tariff structure could help motivate customers to reduce their bills, help the utility reduce demand growth and defer the need for new generation.

EKPC and its distribution cooperatives are still promoting the installation of electric water heaters in order to boost electricity sales, despite the fact that other energy sources such as natural gas provide this service at a lower operating cost. The input data provided by EKPC in Appendix II illustrates this. A natural gas water heater uses 23 million Btu per year, a standard efficiency electric water heater 4,818 kWh/year, and a high-efficiency electric water heater 4,433 kWh/year. The initial capital cost for water heaters is $400, $410 and $525, respectively. IRP Appendix II, Tabs 6 and 7. If we assume that the retail natural gas price averages $7.50 per million Btu, which was the 2002 average for Kentucky, and the retail price of electricity averages 5.5 cents/kWh, the following table can be constructed:

Water Heater Type	Capital Cost	Annual Energy Cost
Natural Gas	$400	$173
Electric (std efficiency)	$410	$265
Electric (high efficiency)	$525	$244

A glance at this table shows that the natural gas water heater is lower in both capital and operating cost. All else being equal, it is clear that from the perspective of the ultimate consumer, gas is the most economically beneficial choice of the three options shown. Even if the retail price of natural gas were $10.00 per million Btu, the annual energy cost of the gas water heater would be $230, which is still less than that of either the standard or the high-efficiency electric water heater. Even accounting for the $100 rebate the utility pays a customer to install a high-efficiency electric water heater, the capital cost and annual energy cost are still both higher than natural gas.

In its responses to KDOE's questions on this subject, EKPC did its best to obscure this clear conclusion. In response to KDOE Question 1b, EKPC stated that its most recent appliance saturation survey "shows that of the homes built in the last 5 years, 6 percent have natural gas

heat and electric water heating. Consumers do not always choose to have all natural gas appliances even when it is available." This information is irrelevant to the question asked. In response to KDOE Question 13a, EKPC provided a detailed discussion of DSMANAGER and the use of retail versus wholesale natural gas prices. In its response to Informal Conference Request 2, EKPC stated that if the Participant test "were to be computed using today's retail price of natural gas, it would have a benefit cost ratio greater than 1.0." EKPC Response to the Information Requests Made at the August 19, 2003 Informal Conference. In view of the calculation shown above, KDOE does not see how this statement can be true.

In response to KDOE Question 1d, EKPC stated, "We believe that most, if not all, of the current marketing efforts are very beneficial to the end consumer." But the simple calculation shown above demonstrates that there is at least one existing DSM program, the Electric Water Heater Retrofit program, that harms the economic interests of participating customers in order to boost electricity sales. EKPC has shown a disturbing degree of unwillingness even to consider the possibility of canceling this uneconomic program, or replacing it with a program that encourages customers to use natural gas for water heating instead of electricity in places where natural gas is available.

Conversely, certain DSM programs with very favorable benefit/cost ratios are slated to be implemented on only a limited scale. According to Appendix II, the estimated benefit/cost ratios for the Button-Up weatherization program are highly positive: Participant test: 2.46; TRC test: 2.84; Societal Cost test: 3.30; Distribution Utility Cost test: 3.82; Power Supply Utility Cost test: 4.90; and even the combined RIM ratio: 1.05, which passes the RIM test and is therefore atypical for an energy efficiency type of DSM program. Yet the program projects the number of new participants remaining constant at approximately 500 new participants each year from now until

2017. IRP, page 80, Table 6-6. The EKPC system serves approximately 360,000 households. IRP, page 2. When the KDOE representative asked at the Informal Conference on August 19, 2003 why the Button-Up program is not slated for a major expansion in size, the response was that it is sometimes difficult to get member distribution co-ops to implement DSM programs. KDOE believes that the set of incentives facing distribution co-ops should be designed so that their preferred strategy is also the strategy that maximizes the benefits for all customers and the EKPC system as a whole. This may require a reexamination of the structure of the rates EKPC charges its member cooperatives.

KDOE's comments on EKPC's 2000 Resource Plan included the following statement:

> The Rocky Mountain Institute has performed detailed research on the question of the value of distributed generation to utility companies. They conclude that "Properly counting approximately 75 documented and measurable diseconomies of scale, not just the few well-known economies of scale, will typically make decentralized ways to make, store, or save electricity around ten times more valuable than conventionally scale-blind comparisons had long shown." Rocky Mountain Institute, "Scale in Power Systems," 1999, www.naturalcapitalism.org/sitepages/pid27.asp . If their analysis is even close to correct, it suggests that EKPC and its member cooperatives may be able to garner substantial economic benefits from distributed generation technologies that may now be overlooked because of outmoded analytical methods.

KDOE Comments on EKPC's 2000 Resource Plan, Case No. 2000-044, 1/11/01, pages 24-25.

EKPC made no response to this point in the context of Case No. 2000-044, and did not take this perspective into account when developing its 2003 IRP. EKPC's response to KDOE Question 3a.

Since KDOE made its comments in 1999, the Rocky Mountain Institute has elaborated and documented these ideas in the form of a full-length book titled, *Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size*, by Amory Lovins et

al., Snowmass, Colorado, 2002. The book describes over 200 ways in which the size of electrical resources affects their economic value. It finds that properly considering the many economic benefits of small-scale distributed resources typically raises their value by a large factor, often approximately tenfold, by improving the utility's system planning, construction, operation, and service quality, and by avoiding societal costs. The book's main findings may be summarized as follows:

- The most valuable distributed benefits typically flow from financial economics – the lower risk of smaller modules with shorter lead times, portability, and low or no fuel-price volatility. These benefits often raise value by most of an order of magnitude (factor of ten) for renewables, and by about 3-5-fold for nonrenewables.

- Electrical engineering benefits – lower grid costs and losses, better fault management, reactive support, etc. – usually provide another ~2-3-fold value gain, but more if the distribution grid is congested or if premium power quality or reliability are required.

- Many miscellaneous benefits may together increase value by another ~2-fold – more where waste heat can be reused.

- Externalities, though hard to quantify, may be politically decisive, and some are monetized.

- Capturing distributed benefits requires astute business strategy and reformed public policy.

Id., Executive Summary, page xv.

If this analysis is correct, it would have important implications for the supply-side options considered by EKPC in its 2003 IRP and in the future. The value of centralized generating options would need to be derated considerably in relation to small-scale distributed resources. KDOE recommends that EKPC's resource planning team become thoroughly familiar with the analyses provided in this book and take them into account when assessing the relative economic value of resource options.

KDOE recognizes that EKPC has taken a number of initiatives in recent years to improve its system. Using landfill gas to produce "green" power, studying the potential for wind

generation in Southeastern Kentucky, proposing new small-scale DSM programs, and continuing to offer energy services through EnVision are all steps in the right direction. There is much more that can and should be done, however, and the 2003 IRP misses many large opportunities for cost-effective enhancements that would benefit the ratepayers, EKPC itself, its member cooperatives and the general public. KDOE's recommendations in this case are the same as those the division gave at the conclusion of Case No. 2001-053 [Application of East Kentucky Power Cooperative, Inc. for a Certificate of Public Convenience and Necessity, and a Certificate of Environmental Compatibility, for the Construction of a 250 MW Coal-Fired Generating Unit (With a Circulating Fluid Bed Boiler) at the Hugh L. Spurlock Power Station and Related Transmission Facilities, Located in Mason County, Kentucky], as follows:

- EKPC should complete a full and comprehensive study of the technical potential of demand-side resources and distributed generation in its service territory.
- EKPC should develop and implement programs to acquire that portion of the DSM and distributed generation resources that are more cost-effective than the lowest-cost supply-side option.
- EKPC and its member cooperatives should reverse those policies that promote the increased use of electricity, especially in cases where such policies are not in the best interests of their ultimate retail customers.
- After completing the above steps, EKPC should conduct an integrated analysis to determine whether or not additional centralized power plants will still be needed in the foreseeable future.

KDOE also recommends that EKPC develop and propose a net metering tariff to the Commission to accommodate customers that want to install small-scale, environmentally benign generating technologies to reduce their electric bills. KDOE would be willing to work with EKPC and the AG, if desired, to suggest provisions that would be included in such a tariff.

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CERTIFICATE OF SERVICE

I hereby certify that on the 30th day of September, 2003 a true and accurate copy of the foregoing pleading was mailed, postage pre-paid, to the following:

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